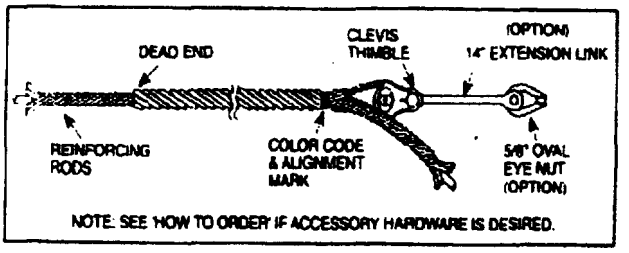
Dulmison
Fiber Optic Dead End For ADSS Cable



NOTE: SEE 'HOW TO ORDER' IF ACCESSORY HARDWARE IS DESIRED.

MATERIALS:

Dead End (FODE)– Heliformed galvanized steel wire provides excellent tensile holding strength without stressing cable.

Reinforcing Rods (FORR)– Heliformed galvanized steel wire protects and provides extra cushioning to the ADSS cable. The ends are bent outward to provide stress relief at the critical cable departure areas. Rods are factory assembled into four subsets which reduce misalignment errors and speeds installation. Sets are color marked at both ends for reversibility.

Extension Link (HEL14-15)– Ductile iron hot dip galvanized 14 inch extension link rated at 15,000 lbs. (NOTE: Not quoted unless prefix code "AS-02" is added to catalog number.)

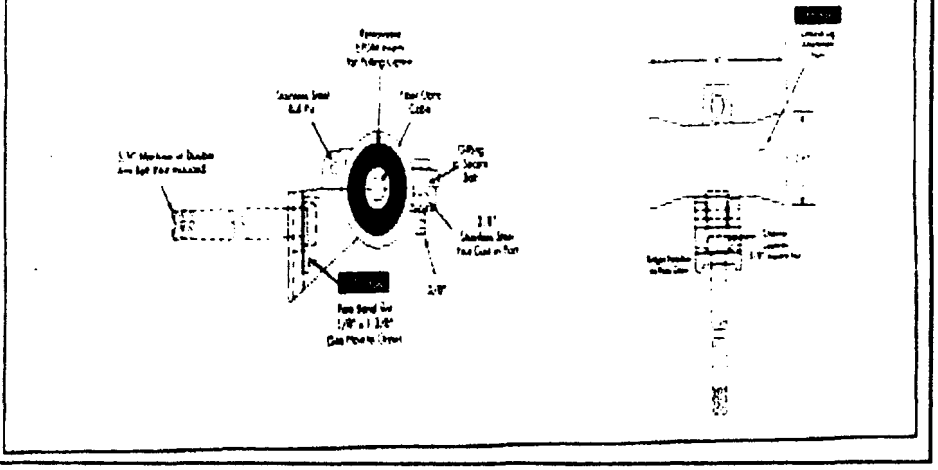
Clevis Thimble (HCT-88)–Galvanized ductile iron thimble rated at 20,000 lbs. for limited and medium span dead end assemblies. Add suffix "NC" to catalog number if clevis thimble is not required.

Oval Eye Nut (HENS-12) – Ductile Iron Hot Dip Galvanized 5/8 Inch Oval Eye Nut. Rated at 12,000 lbs. (Note: Not quoted unless prefix code "AS02" is added to catalog number.)

GENERAL RECOMMENDATIONS:

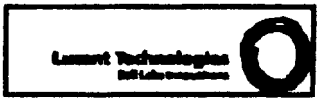
Fiber optic dead ends may be installed once as a temporary (less than 30 days) pulling device prior to its final installation, as long as it is not stressed over 50% of its rated strength.

Dulmison
Fiber Optic Support Clamp (FOSC) For ADSS Cable



Networking/Telco. Partners

- 3Com
- Lucent
- Bell Atlantic



3Com Partnership Advantages

- Clear Understanding of Education Industry
- Consulted, Designed and Installed Largest K-12 Education Networks In The World
- 3Com #1 Networking Vendor In Education
- 3Com's Desktop to Desktop Solution
- Single Point of Contact, Sales, Engineering Support, Installation
- 3Com's Community Support For VBOE NetDay, Publicity, Teacher Training

3Coms Design Requirements

1. Scalability
2. High-Availability
3. High Quality Convergence
4. Overall Cost Effectiveness
5. Flexibility with Virtual Networking
6. Seamless LAN/MAN to WAN
7. Performance
8. Security
9. Manageability
10. Standards and Investment Protection

ATM is the only proven option for large scale, converged networks

Vinelands Decision Criteria:

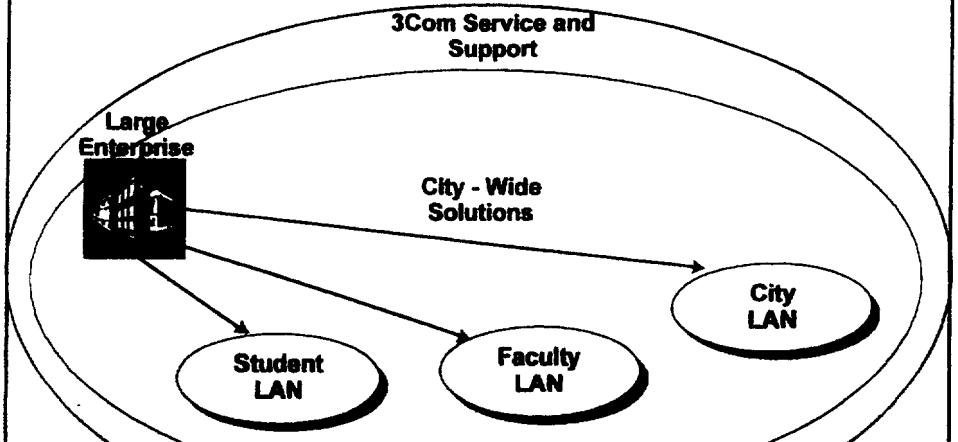
3Coms Decision Criteria - Past...Inheritance

- Installed Base
  - 3,000+ PCs
  - 50+ Computer Labs
  - Cable Plant
  - Equipment
  - Network management
- People skills
- Migration strategies

Key applications

- Internet access: Research and communication
- Multimedia: Integrated video, voice, data
- Distance Learning: Extends school boundaries beyond campus for non-resident students, curricular efficiencies
- Administrative Tools: Accounting, student records
- Residential Networking: Pervasive availability
- High bandwidth requirements
- Intranets: Content security, sensitive material

3Com Strategy for Vineland

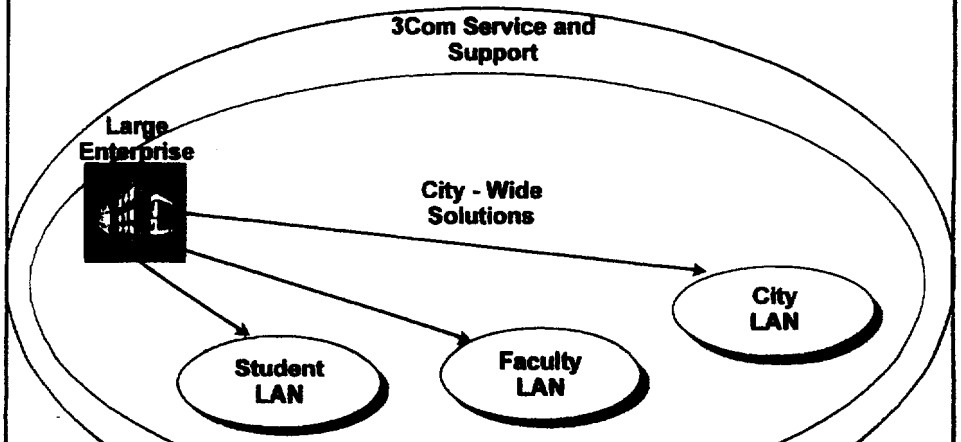


- **"City Wide ATM Backbone"**
  - **Focus on operational efficiency**
  - **Service/support for implementation and installation**
  - **Separate networks sharing common resources**

Key applications

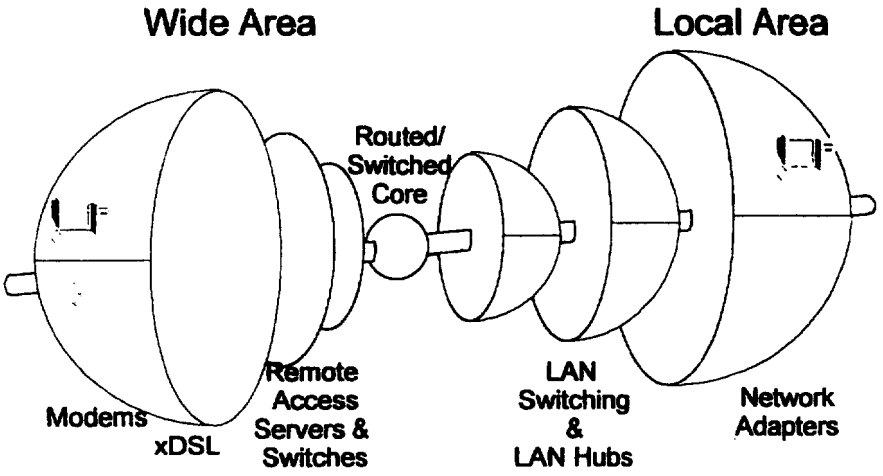
- Internet access: Research and communication
- Multimedia: Integrated video, voice, data
- Distance Learning: Extends school boundaries beyond campus for non-resident students, curricular efficiencies
- Administrative Tools: Accounting, student records
- Residential Networking: Pervasive availability
- High bandwidth requirements
- Intranets: Content security, sensitive material

3Com Strategy for Vineland



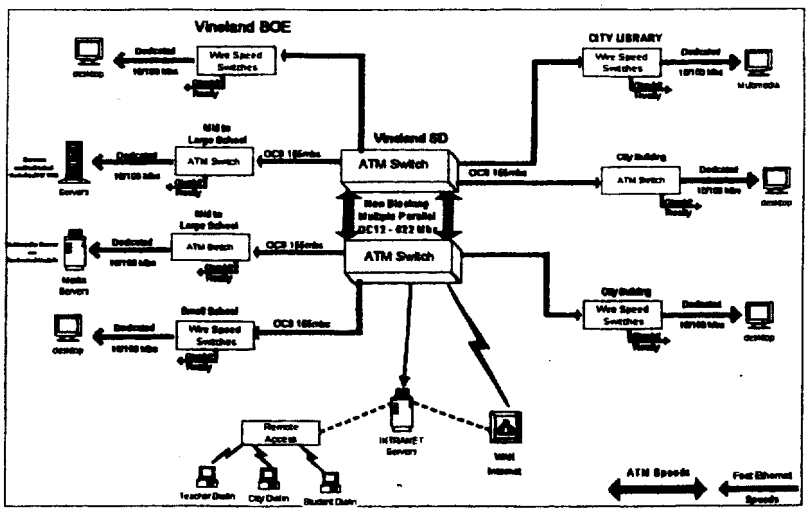
- **"City Wide ATM Backbone"**
  - **Focus on operational efficiency**
  - **Service/support for implementation and installation**
  - **Separate networks sharing common resources**

3Com:
Unique Position in the Industry

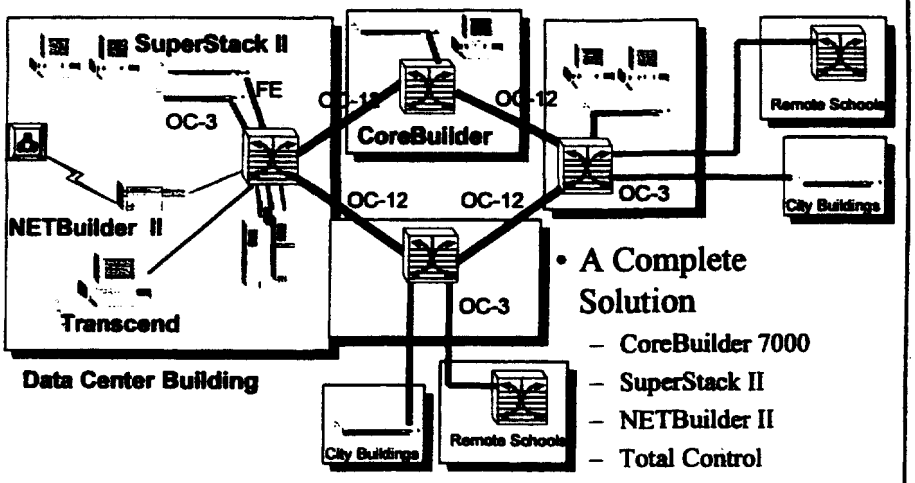


Vineland Design Requirements

Logical Block Diagram



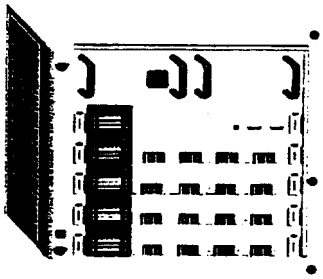
Complete Solution City of Vineland



- A Complete Solution
  - CoreBuilder 7000
  - SuperStack II
  - NETBuilder II
  - Total Control
  - Transcend

CoreBuilder 7000HD

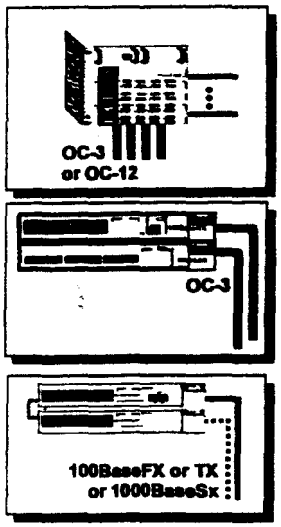
High-Performance, Fault-Tolerant Core & Edge



- High Capacity, Proven, Flexible
  - 5 Gbps non-blocking
  - Up to 32 OC-3 ports (UTP, MMF & SMF)
  - Up to 8 OC-12 ports (MMF & SMF)
- Highly Redundant (fabric, mgmt, power, fans)
- Everything Hot Swappable

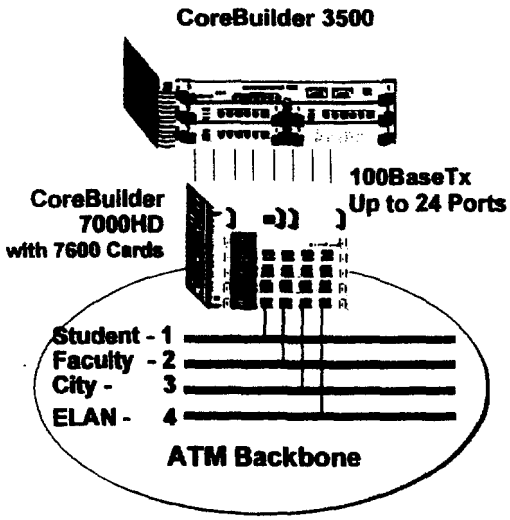
- *ZipChip* ASICs for High-Performance Edge Switching
  - » Up to *144 switched 10BaseT ports* with 4 ATM OC-3
  - » Up to *64 Fast Ethernet* or *16 Gigabit Ethernet* ports
  - » Highest performance, integrated LANE Services (Ethernet and TR)
  - » Full redundancy for LANE services (LES/BUS and LECS)
  - » Plans for Very High-Density 10/100 Layer 3 Edge-Switching (MPOA Client)

"Hot System" ATM Edge Options Easy as #1, #2, #3



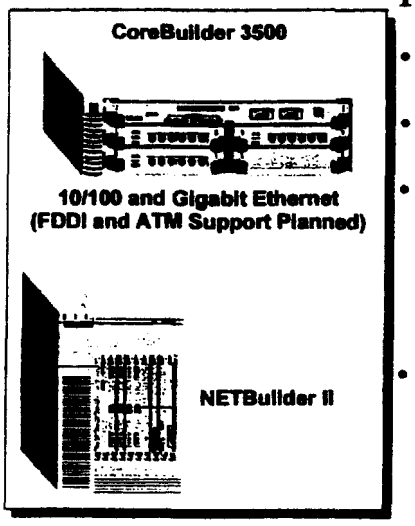
- *#1 CoreBuilder 7000HD*
  For highest performance and high-availability
  (where solution is not cost sensitive)
  - Dynamic load sharing over multiple ATM links
  - Easy to set-up & manage, port-based VLANs
  - Up to 48 10/100 or 144 10BaseT (or a mix as needed)
- *#2 Switch 1000/ATM and 3000/ATM*
  Most popular ATM edge-switching option
  - Low-cost packages with ATM OC-3 included
  - Easy Port and Policy based VLANs
  - Upgrade program to Switch 1100/3300 with ATM
- *#3 Switch 1100 and 3300*
  Lowest cost with 100BaseFX or Tx downlinks
  - One VLAN/ELAN per downlink (until ATM option ships)
  - Most Advanced Layer 2 features & resilient links
  - Use 1000BaseSX for maximum capacity
  - Or upgrade to ATM OC-12 & Layer 3 (with MPOA)

ATM LAN/MAN Routing "Hot System" Using CoreBuilder 3500 Today



- Up to 2.4 Gbps wire-speed routing capacity
- One port per ELAN for up to 24 ELANs
- Easy set-up and management
- Leverages CoreBuilder 7000HD performance with 7600 Fast Ethernet cards
- Lowest total cost, highest performance routing option for ATM

CoreBuilder 3500 & NETBuilder II
For Layer 3 Routing Performance and Functionality

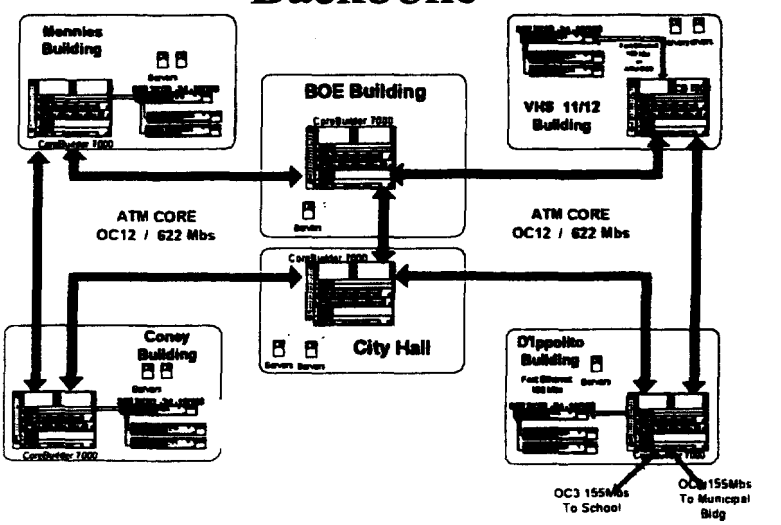


- **When routing is required...**
  - No compromises at Layer 3
- **ATM-attached or LAN-attached**
  - MPOA Server option planned w/ ATM
- **For High-Performance in LAN/MAN**
  - Use CoreBuilder 3500
  - Layer 3 switching with QoS features
  - 4 Mpps with all features turned-on
  - IP, IP Multicast, IPX, AppleTalk
- **For Full Functionality LAN/MAN & WAN**
  - Use NETBuilder II
  - Proven, feature-rich routing
  - All protocols and interfaces

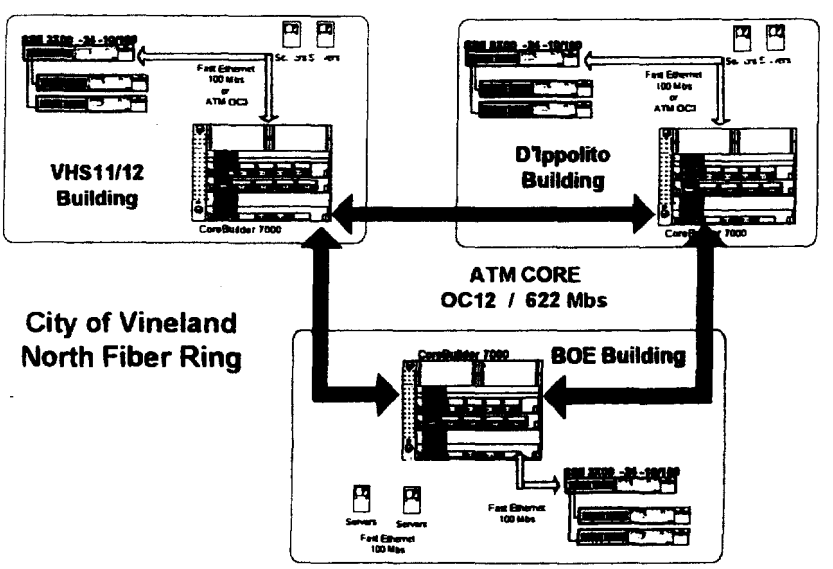
City of Vineland (MAN)

- 3Com implemented 14 CoreBuilder 7000 high-function ATM switches in the network core.
  - Six of the ATM switches are in the Core and deliver the high throughput of OC-12 (622 Mbps)
  - Eight ATM switches (Edge) deliver OC-3 (155 Mbps) and Fast Ethernet to all Closets
  - 100+ SS 1100 & 3300 provide switched 10/100 Mbps Ethernet connections to the desktop from the ATM core.

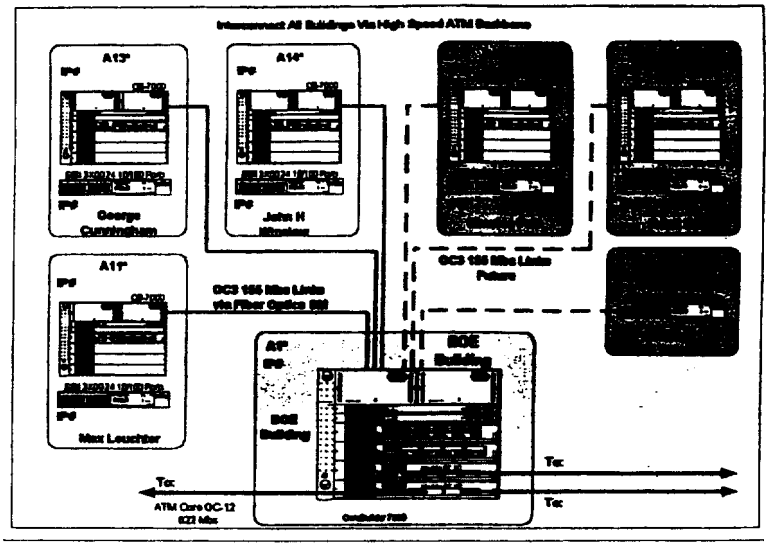
City Wide - Core ATM Backbone



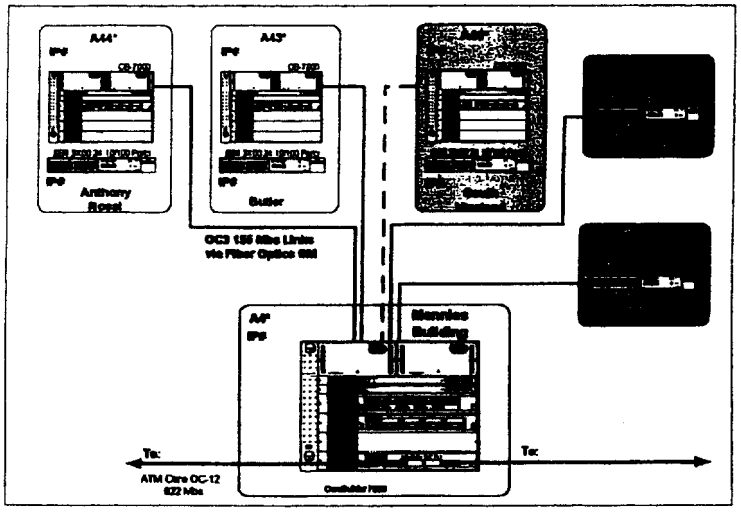
Vineland North Fiber Backbone



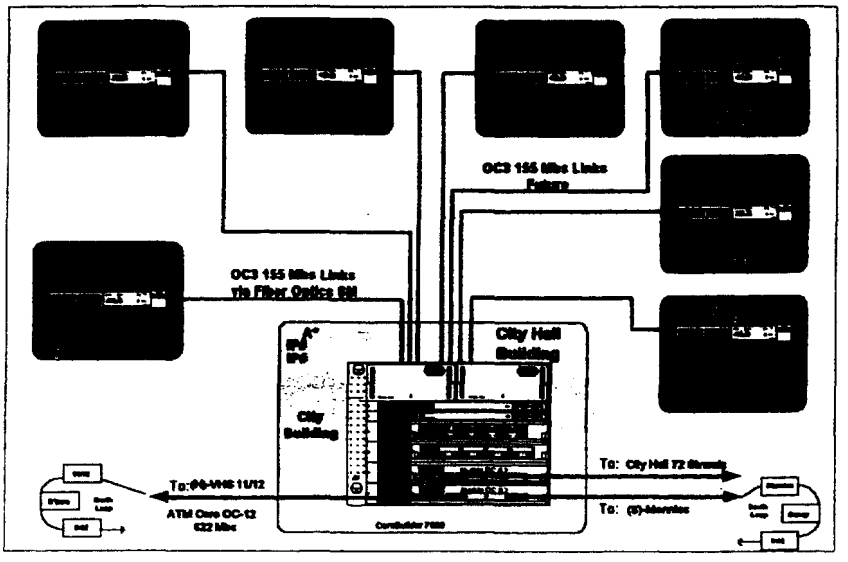
Vineland BOE Building



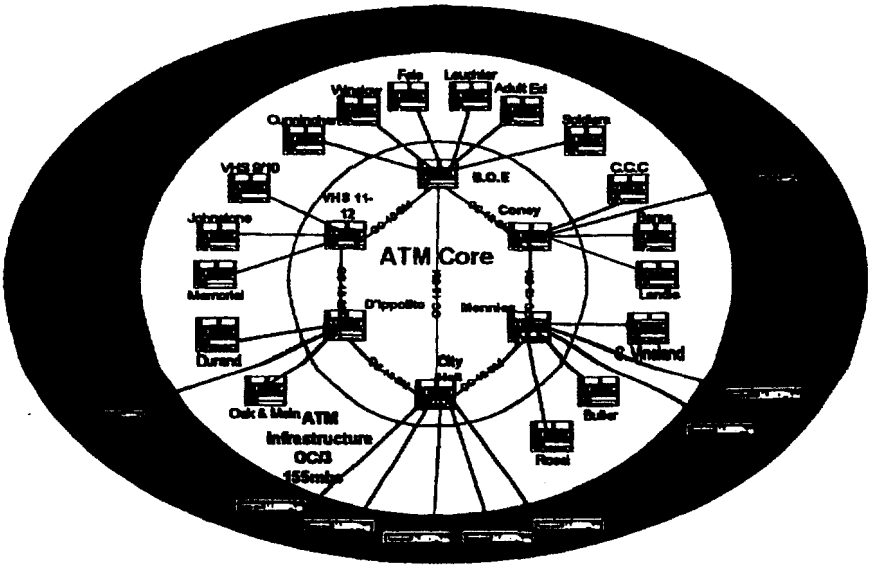
Mennies School



City Hall Bldg..



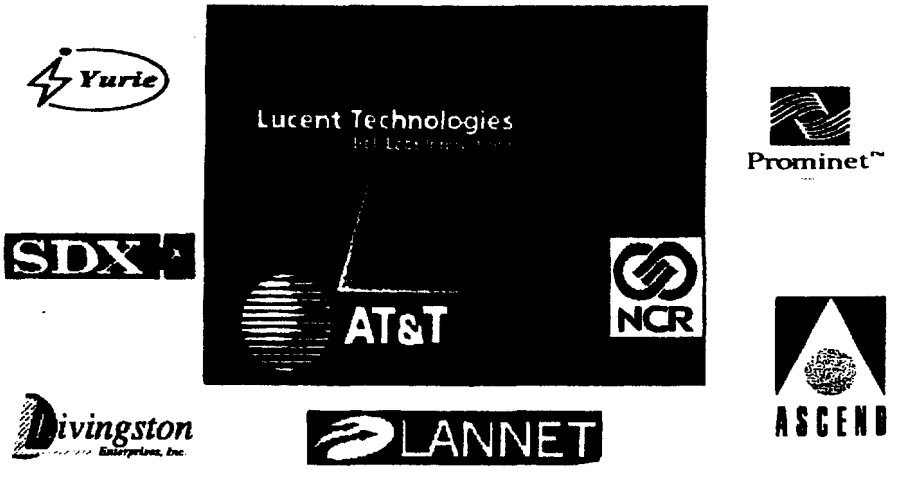
City Of Vineland (MAN)



LUCENT PARTNERSHIP ADVANTAGES

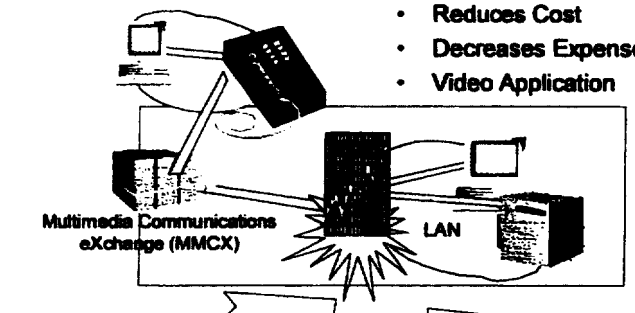
- Years of Experience with State and Local Government
- Committed to Government and Education
- Partnerships and Experience with Urban Empowerment Zones
- Instrumental in Award of TIIAP Grant Funds ($17M in Funds Available in 1999)
- HUD Funds-Sec. 8 Entitlements-Free Internet for Public Housing
- Instrumental in Award of E-Rate Funds for Education

Lucent Technologies: Our Origin



Value of the New Networks

- Enables New Applications
- Reduces Cost
- Decreases Expenses
- Video Application



VOICE NETWORKS
REAL-TIME CALLING
RELIABILITY
MANAGEABILITY
SUPERIOR SERVICE

DATA NETWORKS
STORE & FORWARD
HIGH BANDWIDTH
CUSTOM APPLICATIONS
SCALEABLE

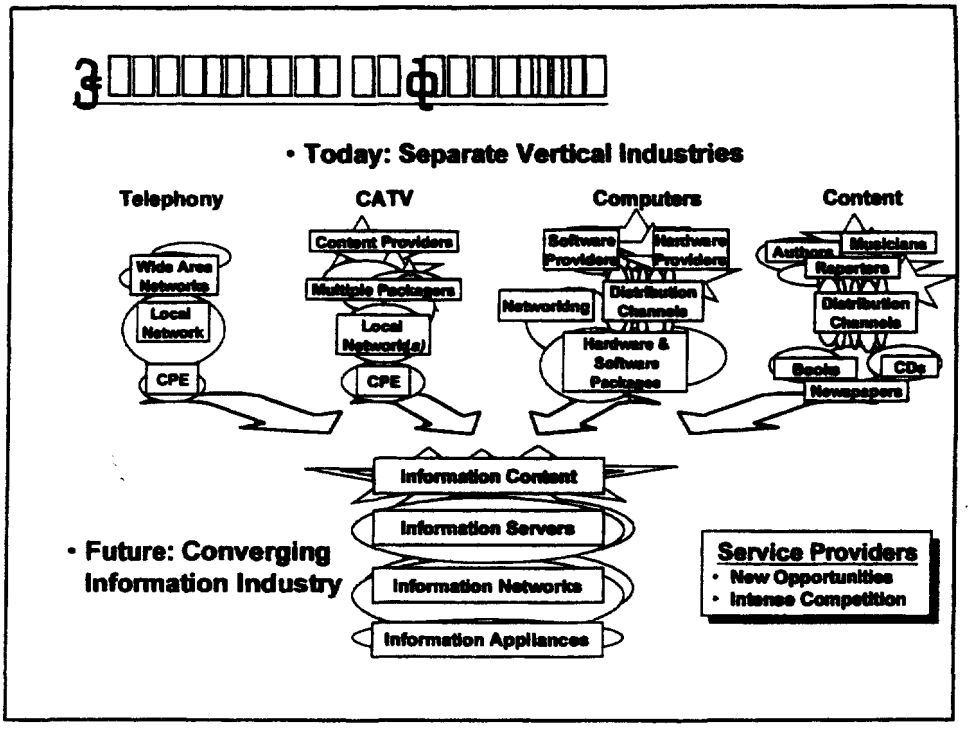
Lucent Products Hold Leadership Positions In Key Enterprise Markets

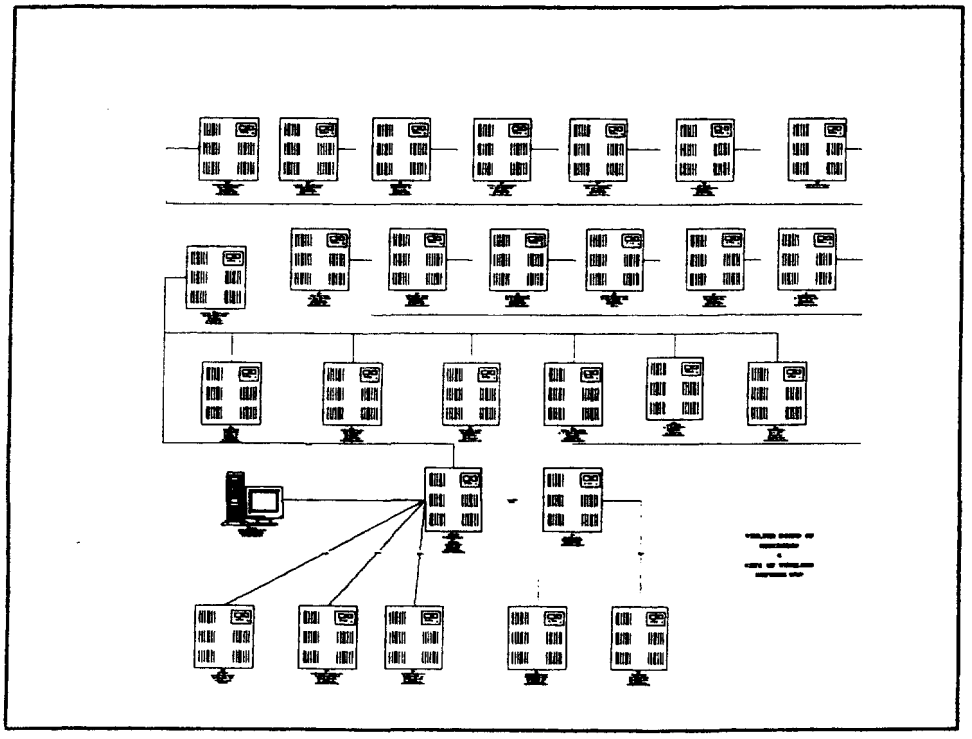
In the USA

- **PBX - No. 1**
- **Wireless Business Systems - No. 1**
- **Small Business Key Hybrid Systems - No. 1**
- **Voice Services and Support - No. 1**

Globally

IP Telephony Products and Services-No. 1


• Today: Separate Vertical Industries
Telephony
CATV
Computers
Content
Wide Area Networks
Local Network
CPE
Content Providers
Multiple Packagers
Local Network(s)
CPE
Software Providers
Hardware Providers
Networking
Distribution Channels
Hardware & Software Packages
Authors
Musicians
Reporters
Distribution Channels
Books
CDs
Newspapers
Information Content
Information Servers
Information Networks
Information Appliances
• Future: Converging Information Industry
Service Providers
• New Opportunities
• Intense Competition



Bell Atlantic Partnership Advantages

All public and non-public schools and public libraries located within BellAtlantic-New Jersey's serving territory will benefit from our commitment to deliver an advanced telecommunications network by 2001. Known as Access New Jersey, this acceleration of Bell Atlantic's Opportunity New Jersey (ONJ) network modernization program makes the broadband network ready for use by New Jersey's public libraries, elementary schools and high schools beginning in 1998. All 28 Abbott districts will be able to connect by the end of 1999.

Bell Atlantic's Access New Jersey program is composed of three major elements:

- Deployment of a $55 million statewide Asynchronous Transfer Mode (ATM) high-speed network for voice, video and data with all 28 Abbott districts able to connect by the end of 1999, and all K-12 public and private schools and public libraries in the Bell Atlantic service area able to connect by year-end 2001.
- Establishment of a $25 million equipment fund for schools and libraries that subscribe to Access New Jersey to acquire the equipment needed to connect to the high-speed network.
- A series of discounts ranging from 31 percent to 72 percent for high speed access to the Internet and voice, video and data services for schools and libraries.

Bell Atlantic Telco Connectivity

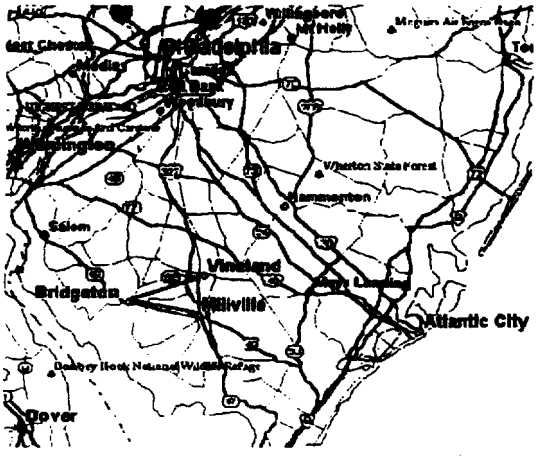
- One 10 Meg ATM Internet Connection for Entire MAN
- One 10 Meg ATM Video Multipoint Video Conferencing Connection to other districts
- One T1 for ISDN connectivity
- Two T1s for Dial-In Internet Access
- Two T1s for BOE PBX
- Two T1s for City EPN (connected to BOE PBX)
- One T1 for Police EPN (connected to BOE PBX)

Schedule A

Service	Bandwidth	Tariff Rate	Access New Jersey Rate	Percent Discount
ISDN up to 300 hrs (over 300 hrs standard usage rates apply)	128 kbps	$360	$100	72%
Frame Relay	56 kbps	$175	$100	43%
	1.5 mbps	$435	$300	31%
	4 mbps	$2,300	$1,325	42%
	6 mbps	$2,600	$1,425	45%
	22 mbps	$3,000	$1,625	46%
	45 mbps	$3,800	$1,825	52%
SMDS	56 kbps	$225	$100	56%
	1.5 mbps	$570	$350	39%
	4 mbps	$2,000	$1,350	33%
	10 mbps	$2,500	$1,450	42%
	16 mbps	$3,000	$1,650	45%
	25 mbps	$3,500	$1,850	47%
	34 mbps	$4,000	$1,900	53%
ATM	1.5 mbps	$600	$400	33%
	10 mbps	$3,700	$1,800	51%
	45 mbps	$4,450	$2,500	44%
	OC3c-DF	$6,500	$3,000	54%
	OC3c-SON	$9,200	$4,000	57%

Cumberland County Distance Learning Partnership

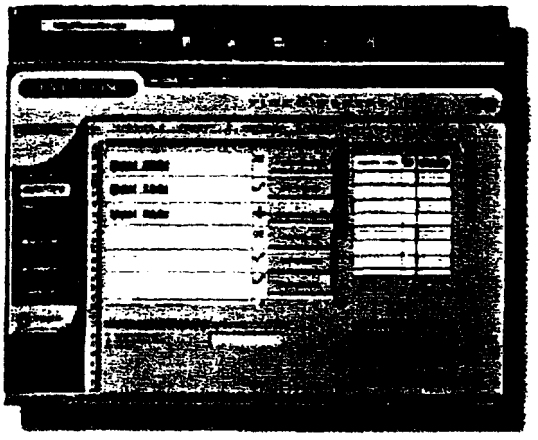
- Three Abbott districts form the partnership
  - Bridgeton
  - Millville
  - Vineland



Overview of Video Hardware

- All three school districts have a complete videoconferencing system
- Vineland School District serves as the hub for the system with the possibility to connect with other video-conferencing systems in the future
- ISDN gateway enables connectivity to other sites with ISDN capability
- Possibility to connect with other schools/sites

Introducing FVC.COM's Video Portal

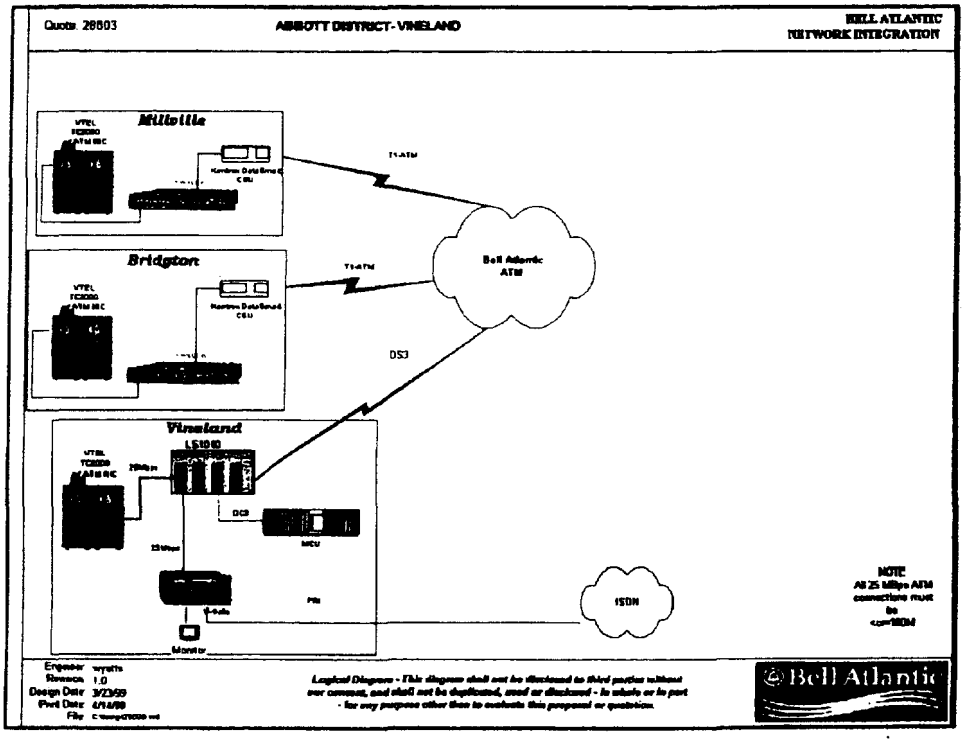


- View the Video Portal
- Read about Broadband Video Services

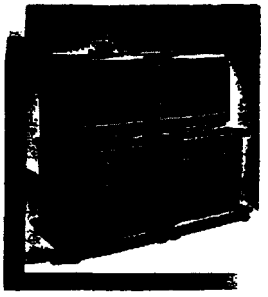
Bell Atlantic Partners with FVC.COM to Deliver Broadband Video Services over Statewide "Access New Jersey" Network

Bell Atlantic Investing $55 Million to Deliver on Governor Whitman's Commitment to Schools

September 28, 1999 - NEWARK, N.J. and SANTA CLARA, Calif. - September 28, 1999 - New Jersey's students will be moving into the fast lane of the Information Highway over a 955-million, broadband digital video network. The network, known as "Access New Jersey," is an innovative partnership between Bell Atlantic - New Jersey and FVC.COM. ...more



TC2000

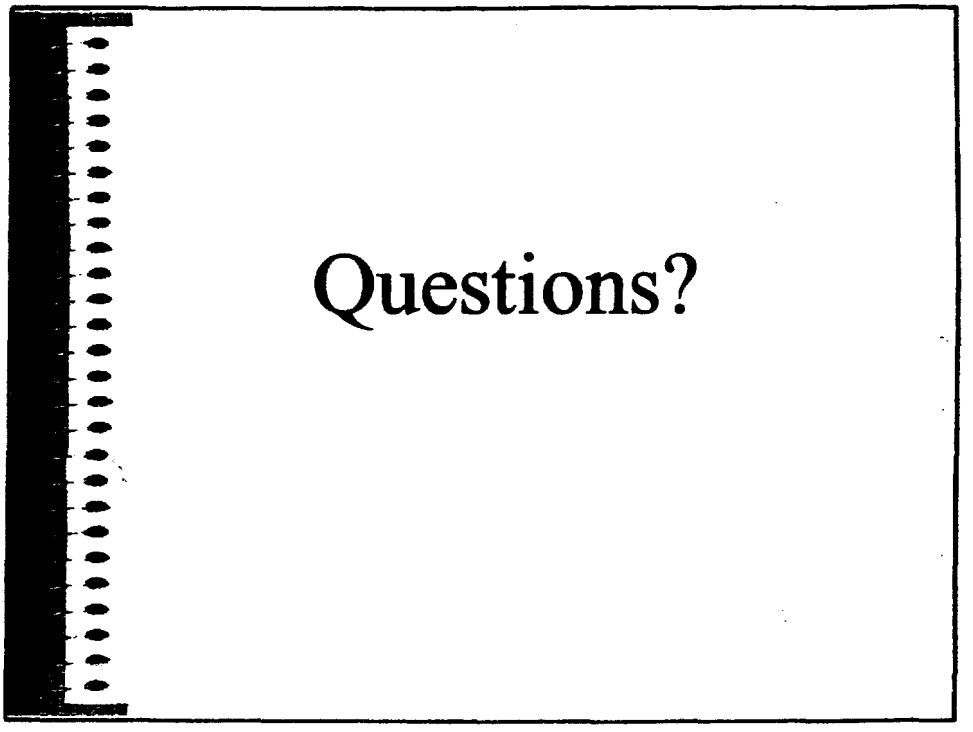


TC2000 Large Group Conferencing System

The TC2000 is a full-multimedia system, stepping up features for more dynamic video communications. Video and audio are crisper because the system comes standard with a 512Kbps data rate, upgradable to the highest T1/E1 connection. And data conferencing is made easier, with the TC2000's large dual monitors. They give your data and colleagues equal focus -- as well as accommodate larger meeting groups. Similar to the TC1000, the TC2000 is scalable and easily networked. Any-sized organization -- from corporate, to education, to healthcare -- will experience significant improvements in their communications without the barriers of distance. How long before you hear yourself saying, "I'll see you on the VTEL?"

Future potential for growth

- Reaching out to businesses and other communities.
- Implement distance learning applications with other schools and districts.
- Provide students with an enriched educational experience.
- The possibilities are limited only by our imaginations.


Questions?

BPA teams up with Northwest utilities to make fiber optic network available

The Bonneville Power Administration and the Washington Public Utility Districts Association have agreed to make fiber optic cables available to public and private entities and the communities they serve.

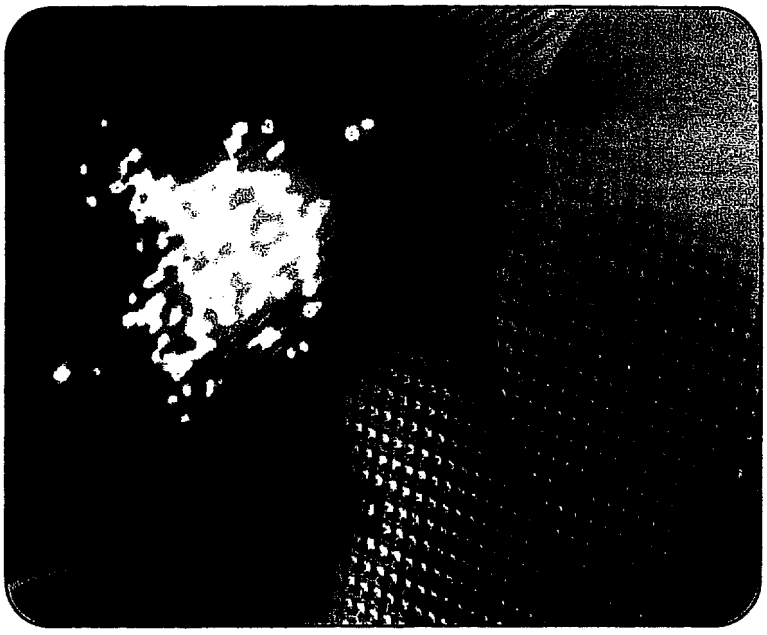
The network is slated to have interconnection points within two years in every county where BPA fiber now runs. Participating utilities will use the network for utility purposes and plan to make excess capacity available to other organizations, including schools, hospitals, emergency services, museums, libraries, businesses that contribute to rural economic development, and federal, state, local and tribal governments. The utilities intend to provide open access to the network at nondiscriminatory, nonprofit, cost-based rates.

"This agreement will bring the information superhighway to rural areas," said Chuck Meyer, BPA acting deputy administrator. "We are offering special access to anyone who will provide services to those areas at a reasonable cost."

"These lines will enhance utility operations, but we're also pleased to be working with Bonneville to open up available lines to our communities," said Don Godard, manager of Grant County PUD and chair of a committee overseeing development of the public telecommunications network. Many PUDs and other utilities in the region serve communities that currently do not have high-speed telecommunication facilities.

WPUDA represents the 28 PUDs that provide electricity and water service in Washington. The association is organizing a nonprofit corporation to set up and operate the network. Sixteen PUDs will belong to the organization initially. Other utilities and other entities may join in the future. ■

Fiber Optics:



Washington PUD Association, BPA Sign Historic Agreement

Washington's rural communities are a step closer to the information superhighway thanks to a new contract between the Washington PUD Association (WPUDA) and the Bonneville Power Administration (BPA).

BPA and WPUDA signed an agreement to make fiber optic cables available to public and private utilities and other entities, and to the communities they serve.

The PUD Association is organizing a nonprofit mutual corporation, called Northwest Open Access Network, to operate the fiber system. Sixteen PUDs will belong to the organization initially. More utilities and other entities may join in the future.

Greg Marney, director of telecommunications for WPUDA, said the network is expected to be in operation by early 2000. Interconnection points will be available in every county where BPA fiber now runs within the next two years. NOANet will provide access to telecommunication transport among its members. The individual members will operate the network within their own service areas.

"The areas this agreement will serve are small markets," said Jack Robertson, former BPA deputy administrator. "They sometimes do not represent economic investment opportunities. To achieve our objective, we are offering special access to anyone who will provide services to those areas at a reasonable cost. Washington PUD Association is the first in Washington to step up and provide this kind of service to the public.

"Bonneville's assets are a public resource, and we want to use them to meet public needs. This agreement is very much in the spirit of BPA's original mission to bring utility services to under-served areas. We look forward to working with others to achieve this goal."

"These lines will enhance utility operations, but we're also pleased to be working with Bonneville to open up lines to our communities," said Don Goddard, manager of Grant County PUD and chairperson of a committee overseeing development of the public telecommunications network. "Many PUDs and other utilities serve communities that currently do not have high speed telecommunication facilities.

"We want the people we serve to have all the opportunities that urban dwellers enjoy," he said. "This really is a historic opportunity to bring our communities into the modern era, much like the rural electrification effort of the 1930s and 1940s."

Excess Capacity Intended for Community Use

NOANet's utility members will use the network for utility purposes and plan to make excess capacity available to other organizations, including schools, hospitals, museums, libraries, businesses that contribute to rural economic development, and federal, state, local and tribal governments. The utilities intend to provide open access to the network at nondiscriminatory, nonprofit, cost-based rates.

Rural communities are not economically attractive to most local and long haul telecommunications companies because of the lack of population density and remoteness of connections. Rates can be four times higher than those for urban areas. But end-user costs for rural and remote areas served by the BPA program will be roughly comparable to those paid by end users in larger communities in the Northwest.

BPA's rates for the public benefits fiber program fully recover BPA's costs to install and operate.

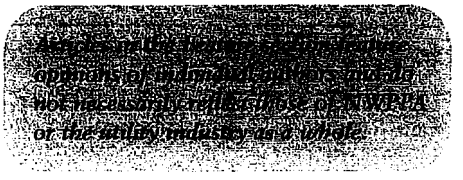
BPA has installed fiber optic cable along its electric transmission lines to operate the regional power grid. The fiber replaces an existing microwave system that is becoming obsolete. Fiber has tremendous capacity — more than meets BPA immediate needs — so the federal power agency is making some of the excess available to benefit the public.

How Utilities Use Fiber Optics

High-speed digital telecommunication technologies have a number of applications in the utility industry. Electric utilities use the technology to direct the delivery of power where it is needed, with split-second adjustments. Utilities can offer remote and real-time meter-reading and energy management services, enabling customers to cut costs and use energy efficiently. Utilities also need Internet connections and advanced data networking among scattered facilities.

BPA has a commercial fiber program for companies not offering broadband capacity to small markets. This too makes use of excess capacity not needed immediately to keep the power grid reliable. Money earned is used to offset the cost of installing fiber optics cable. ■

SOURCE: WPUDA Current, Fall 1999 issue



What is NOANet?

The Washington PUD Association is organizing the Northwest Open Access Network (NOANet) to manage the fiber optic cables leased from BPA. NOANet will provide its utility members with the telecommunication highway they need to effectively operate their electric and water utilities, and will make excess capacity available to others. NOANet will benefit the public by operating on a nonprofit basis, and by providing open, nondiscriminatory access to all end-use customers and suppliers of telecommunication services.

NOANet will provide the backbone of a Pacific Northwest telecommunication superhighway; it will not provide telecommunication services. Individual NOANet members or associates will be responsible for building telecommunication systems within their service areas that will connect with the backbone system.

Membership in NOANet will be open to all who can legally join, and who agree to provide public benefits by offering use of their telecommunication systems to customers and telecommunication suppliers on a nonprofit basis. Others may participate on the same basis.

Source: WPUDA Current, Fall 1999 issue.

A news summary for members of the American Public Power Association No. 99-49 December 13, 1999

PUBLIC POWER WEEKLY

GTE sues Douglas County PUD over fiber optic network

Telecommunications giant GTE has filed suit against Public Utility District No. 1 of Douglas County, Wash., in an effort to keep the PUD out of the telecom business. The suit, filed Dec. 6 in Douglas County Superior Court by GTE Northwest Inc., charges the PUD with violating state law governing fiber optic systems.

The same day GTE filed its lawsuit, the Washington Independent Telephone Association filed suit against Public Utility District No. 2 of Pacific County in an effort to stop that PUD from offering Internet service. Also on Dec. 6, the Washington telephone companies announced a legislative proposal that would prohibit public power utilities in the state from offering telecommunications services that compete with the phone companies.

Ironically, the suits and the media blitz announcing the telephone companies' proposal came a day after a local newspaper, the *Wenatchee World*, ran a front-page news story about residents of rural areas of the state who still do not have telephone service.

In the Douglas County PUD case, a GTE spokeswoman said the telecommunications company fears losing business to a PUD-operated communications system because the private company might not be able to provide service at the same low prices as the

(continued on page 5)

There are still hamlets in Washington state where even basic telephone service is not available, the *Wenatchee World* reported Dec. 5. Above are Larry and Barbara Brady at the entrance to their driveway near a marker that reminds them they are without a phone even though a GTE cable runs 100 yards away from their home. ***Photo by Don Seabrook,*** **Wentachee World**

GTE sues Douglas County PUD over fiber optic network

(continued from page 1)
public power utility.

The PUD, headquartered in East Wenatchee, Wash., has built a fiber optic network to use for remote meter reading and other electric utility applications. The utility leases excess capacity on the system to a bank, a local school district, a telecommunications company and to county offices, utility Manager Bill Dobbins told *Public Power Weekly*.

The PUD plans to expand the network from the current 30 miles of fiber optic cable, which links the utility's substations, to 102.5 miles, Dobbins said. That will enable the utility's fiber optic network to connect with a hydro power plant the PUD operates on the Columbia River, he said.

GTE says a 1998 ruling by the state attorney general bars PUDs from building fiber optics networks beyond what they need to provide electric service to their customers. The ruling says PUDs can lease excess capacity on their fiber optic networks, but prohibits them from building extra facilities for the purpose of leasing them out, GTE said.

"We feel Douglas PUD is building significantly more capacity than they need," said Marilyn Hoggarth, GTE's public affairs manager for Washington. "They're out soliciting customers to use that extra capacity because the system more than services their needs."

GTE said it is "concerned by government entities, such as public utility districts, entering the telecommunications business with an unfair advantage because of cost subsidies, tax exemptions and other issues. We don't believe PUDs should use taxpayer or ratepayer dollars to construct telecommunications facilities and provide telecommunications services."

But Dobbins said the utility has built the 48-fiber system with its own needs in mind. "The purpose of putting this system in is to support our electrical functions," he said.

The amount of fiber optic capacity a utility is likely to need in the future "is a judgment call," he told *Public Power Weekly*. Some utilities, such as the one operated by the city of Anaheim, Calif., have installed fiber optic cable with 144 fibers—far more than the PUD's 48-fiber system, he noted.

Dobbins added that the Douglas County PUD serves about 15,500 meters in an area twice the size of Rhode Island. Much of Washington state is rural and lacks access to high-speed communications, he said. Public utility districts in the state want to be able to offer telephone and other telecommunications services if they are needed in their communities, he said.

A bill before the state Legislature, Senate Bill 6105, would authorize this, in communities where residents voted in favor of a PUD-run telecom system.

Telephone companies sue Pacific County PUD

The Washington Independent Telephone Association filed suit in Pacific County Superior Court Dec. 6 against Public Utility District No. 2 of Pacific County. The telephone companies want to stop the PUD from offering Internet service, said Terry Vann, executive vice president of WITA.

"Public utility districts are untaxed and unregulated and they should not be allowed to use their tax subsidies to unfairly compete with tax-paying private telephone companies," said Vann.

The same day WITA filed suit against the Pacific County PUD, the telephone association proposed legislation designed to keep PUDs out of the telecommunications business. The proposed bill would clarify that private, independent telephone companies—not PUDs—are the preferred providers for advanced telecom services in rural areas. ■